

## WHAT IS CLAIMED IS:

1. A model adaptive apparatus for performing an adaptation of a  
5 model used in pattern recognition which classifies input data in a time  
series into one of a predetermined number of models, said model adaptive  
apparatus comprising:

data extraction means for extracting said input data, corresponding to  
a predetermined model, which is observed in a predetermined interval, and  
10 for outputting the data as extracted data; and

model adaptation means for performing an adaptation of said  
predetermined model on the basis of the extracted data in said  
predetermined interval and the degree of freshness representing the  
recentness of the extracted data.

15 2. A model adaptive apparatus according to claim 1, wherein said  
pattern recognition is performed based on a feature distribution in a feature  
space of said input data.

20 3. A model adaptive apparatus according to claim 1 or 2, wherein  
said model adaptation means performs an adaptation of said predetermined  
model by using, as said freshness, a function in which the value changes in  
such a manner as to correspond to the time-related position of said extracted  
data in said predetermined interval.

25 4. A model adaptive apparatus according to claim 3, wherein said  
function is a monotonically increasing function which increases as time  
elapses.

30 5. A model adaptive apparatus according to claim 4, wherein said  
function is a linear or nonlinear function.

6. A model adaptive apparatus according to claim 4, wherein said  
function takes discrete values or continuous values.

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7. A model adaptive apparatus according to claim 4, wherein said function is a second-order function, a third-order function, or a higher-order function.

5        8. A model adaptive apparatus according to claim 4, wherein said function is a logarithmic function.

9. A model adaptive apparatus according to any one of claims 1 to 8, wherein said input data is speech data.

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10. A model adaptive apparatus according to claim 9, wherein said predetermined model is a sound model representing noise in an interval which is not a speech segment.

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11. A model adaptive apparatus according to any one of claims 1 to 10, wherein said data extraction means comprise:

- framing means (2) having an input for receiving a source (1) of speech and/or environmental noise and for producing in response data frames;
- 20    • noise observation interval extraction means (3) for extracting a noise vector for a number (M) of frames in a noise observation interval (T<sub>n</sub>);
- feature extraction means (5) responsive to said noise vector (a) and to an observation vector (a) in a speech recognition interval to produce a feature vector (y); and
- 25    • no-speech sound model correction means (7) responsive to said noise vector.

12. A model adaptive apparatus according to any one of claims 1 to 11, further comprising:

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- power spectrum analysis means (11) for receiving said extracted data;
- noise characteristic calculation means (13) responsive to environmental noise; and

- feature distribution parameter calculation means (12) for producing a feature distribution parameter (Z) in response to said power spectrum analysis means and said noise characteristic calculation means.

5           13. A model adaptive apparatus according to claim 12, further comprising:

- a plurality of identification function computation means (21-s, 21-1- $\times$  21k) of which one at least receives a no-speech model, said means receiving said feature distribution parameter (Z) and producing in  
10           response a respective identification function ( $G_s(Z)$ ,  $G_1(Z) - G_k(Z)$ ); and
- determination mean (22) responsive to said identification functions to produce a recognition result on the basis of a closest match.

15           14. A model adaptive apparatus according to any one of claims 1 to 13, further comprising:

- feature extraction means for extracting the features of said input data;
- storage means for storing a predetermined number of models into which said input data is to be classified; and
- classification means for classifying the features of said input data,  
20           corresponding to a predetermined model, which is observed in a predetermined interval, and for outputting the data as extracted data.

25           15. A pattern recognition apparatus for classifying input data in a time series into one of a predetermined number of models, said pattern recognition apparatus comprising:

- feature extraction means for extracting the features of said input data;
- storage means for storing said predetermined number of models;
- classification means for classifying the features of said input data  
30           into one of said predetermined number of models;
- data extraction means for extracting said input data, corresponding to a predetermined model, which is observed in a predetermined interval, and for outputting the data as extracted data; and
- model adaptation means for performing an adaptation of said  
35           predetermined model on the basis of the extracted data in said

predetermined interval and the degree of freshness representing the recentness of the extracted data.

16. A model adaptive method for performing an adaptation of a model used in pattern recognition which classifies input data in a time series into one of a predetermined number of models, said model adaptive method comprising:

5 a data extraction step of extracting said input data, corresponding to a predetermined model, which is observed in a predetermined interval, and  
10 of outputting the data as extracted data; and

a model adaptation step of performing an adaptation of said predetermined model on the basis of the extracted data in said predetermined interval and the degree of freshness representing the recentness of the extracted data.

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17. A recording medium having recorded therein a program for causing a computer to perform an adaptation of a model used in pattern recognition which classifies input data in a time series into one of a predetermined number of models, said program comprising:

20 a data extraction step of extracting said input data, corresponding to a predetermined model, which is observed in a predetermined interval, and of outputting the data as extracted data; and

a model adaptation step of performing an adaptation of said predetermined model on the basis of the extracted data in said  
25 predetermined interval and the degree of freshness representing the recentness of the extracted data.